

After 2 p. m. of the 19th the typhoon moved WNW., or W. by N., and it is very probable that it filled up on the 21st near the northern part of Hainan or the southern China coast north of Hainan.

The typhoon of the Ladrone Islands and the Bonins.—This typhoon seems to have formed on the 13th to 14th over the Ladrone Islands, about 250 miles north of Guam, where a gale from the southwest quadrant was observed for a good number of hours on the 15th and 16th. The typhoon moved slowly NW. on the 14th to 17th and recurved gradually to NE. on the 18th and 19th southwest and west of the Bonins. A gale from the S. was reported on the 20th by the station of Chichijima. The typhoon was situated at noon of the 21st in about 144° longitude E. and near 35° latitude N., moving north-eastward.

The typhoon of Formosa and China.—The last typhoon of the month appeared on the 25th over the Pacific about 300 miles to the east of San Bernardino Strait. The first part of the track before the 25th is not certain, but probably it formed north of Yap and west of Guam on

the 24th near 139° longitude E. and 13° latitude N., and moved westward until the 25th or 26th, when it inclined northwestward. The typhoon was situated at 6 a. m. of the 27th near 125° longitude E. and 16° latitude N., moving NW. by N. At 6 a. m. of the 28th, the center was near or over the Batanes Islands, and in the afternoon of the same day it traversed Formosa, moving still NW. by N. On the 29th, in the early morning, the typhoon entered China not far from 119° longitude E. and 26° latitude N.

Besides the typhoon just mentioned, a low-pressure area traversed Luzon, to the south of Manila, moving westward on the 23d. Once in the China Sea it developed into a depression or typhoon which moved probably WNW., and finally filled up in about 111° longitude E. and 16° latitude N.

Before finishing this article we may add that the last typhoon of August, after passing to the west of Shanghai, recurved NE. toward Korea and the Sea of Japan. It was felt severely in Korea during the night of September 3 to 4.

NOTES ON WEATHER IN OTHER PARTS OF THE WORLD.

British Isles.—During the month roughly half the area of the British Isles received a rainfall below the average. * * * The deficiencies were nowhere very large, amounting to more than 40 per cent only in the Western Highlands. * * * The rainfall over the British Isles was rather more uniform than is usual at the season.

The general rainfall expressed as a percentage of the overage was: England and Wales, 123; Scotland, 87; Ireland, 117; British Isles, 110.

In London, Camden Square, the mean temperature for September was 55.5° F., or 2.2° F. below the average.¹

Switzerland.—ROME, September 14.—Reports from the Alps say that snow is falling heavily. At some places it has reached a foot in depth, especially around Mont Blanc, Simplon, and St. Gothard. In the Tyrol the temperature has fallen to winter levels in contrast to the excessive heat of a few weeks ago.—*New York Herald*, September 15, 1922.

China.—A typhoon broke over Chefoo (Shantung) on the 2d and lasted for 36 hours, but the damage done was not very extensive.¹

Philippine Islands.—MANILA, September 19.—Serious damage is believed to have resulted from a typhoon which has swept over the Philippines for the last 36 hours.—*New York Herald*, September 19, 1922.

Australia.—Excellent rains were recorded throughout South Australia during the month and there was every prospect of a really good harvest. The other States also had good harvests.¹

Brazil.—* * * The distribution of rain in the north and central regions was very irregular, some parts having a fall exceeding the normal and others a deficit. In the southern area the rainfall averages 39 mm. below normal. Small high-pressure areas with very active wind circulations prevailed throughout the month and temperatures were generally high. The state of the crops was satisfactory on the whole.¹

¹ *Meteorological Magazine*, October, 1922.

DETAILS OF THE WEATHER IN THE UNITED STATES.

GENERAL CONDITIONS.

A warm, dry month in practically all parts of the country. Drought was most severe south of the 40th parallel; in Kansas, North Dakota, and parts of the upper Lake region, the upper Ohio Valley, and in the District of Columbia, however, rainfall was above normal. (See inset on Chart IV.)

The dry weather was rather definitely related to the pressure distribution and the latter naturally was conditioned by the movement in latitude of cyclones and anticyclones, particularly the slow southeastward drift of the latter across the Lake region, New England, and the Middle Atlantic States, as shown by Charts I and II.

CYCLONES AND ANTICYCLONES.

By W. P. DAY.

No really important storms were charted within the area of the United States proper; however, there were three storms of tropical or near tropical origin in the western Atlantic Ocean adjacent to our coast. The two storms, marked "III" and "V" on the chart were the small typical vortices of young tropical cyclones or hurricanes. The third (No. VI), larger and more far-reaching in its effects, developed on the south side of a strong anticyclone, the consequent constriction of the isobars between the two centers of action causing winds

of whole gale force which died down as the anticyclone was disintegrated on passing off unto the Gulf Stream. On the morning of the 21st this storm had on its periphery the small vortex of the hurricane marked "V" on the chart, the latter apparently continuing as a separate disturbance. Lacking reports over that portion of the Atlantic, the further history of this interesting pair is not now known.

Cyclones.	Al- berta.	North Pa- cific.	South Pa- cific.	North- ern Rocky Moun- tain.	Colo- rado.	Texas.	East Gulf.	South At- lantic.	Cent- ral.	Total.
September, 1922.	5.0			1.0			1.0	1.0	2.0	10.0
Average number, 1892-1912, in- clusive.....	4.1	1.1	0.4	0.6	0.7	0.3	0.4	0.2	0.7	8.5

Anticyclones.	North Pacific.	South Pacific.	Alber- ta.	Plateau and Rocky Moun- tain Region.	Hudson Bay.	Total.
September, 1922.			2.0		2.0	8.0
Average number, 1892-1912, in- clusive.....	2.1	1.0	3.5	0.7	0.6	7.9

FREE-AIR CONDITIONS.

By L. T. SAMUELS, Meteorologist.

Free-air temperatures were, in general, above the average for the month. (See Table 1.) Departures at the surface and lower levels conformed closely with those shown in Climatological Chart III. Exceptions in this respect may be explained as follows: The negative departures found at the surface and 250-meter level at Broken Arrow are very likely a result of the large percentage of kite flights made during the early morning and evening hours, at which times wind conditions were most favorable. The small negative departures found at Due West at all levels would seem to be due to the very short period from which present averages are now obtainable. During the first part of the month, when abnormally high temperatures prevailed generally over the country east of the Rocky Mountains, every aerological station reported maximum temperatures exceeding its previous records for September. These occurred in most cases both at the surface and at various levels above. An examination of the prevailing wind direction at these times revealed a southerly component in every case, thus giving additional evidence of the close relation between free-air temperatures and the source of the air supply.

Relative humidities were mostly below the average for both upper and lower levels, but departures were small in practically all cases.

Vapor pressure departures were in general agreement with those for temperature. During the latter part of the month when drouth conditions were prevalent over large sections of the Plains States and the region east of the Mississippi River, it was noted that vapor pressures at the surface and in the upper levels remained appre-

ciably below their averages. These departures were especially large at the southern stations and very likely account for the large negative departures found at Broken Arrow and Groesbeck in Table 1.

In Table 2 are shown the resultant winds for the month and their averages. The larger southerly components for the month compared to the average are in striking agreement with the positive temperature departures previously referred to.

Pilot-balloon observations at Washington and surrounding stations on the 26th showed complete reversals of the wind direction above the 1,500 meter level from those at the surface. This region was in the southern part of an anticyclone and easterly surface winds shifted to westerly at comparatively low altitudes. As is usually found under such conditions the surface-temperature gradients from south to north were steep, and thereby were instrumental in reversing the surface-pressure system a short distance above.

A significant feature of the month was the westerly winds observed in the lower and upper levels at San Juan on the 17th and 18th, a direction exactly opposite to that usually found in this latitude. In the discussion of "Storms and weather warnings" during the month by E. H. Bowie in this number of the REVIEW, reference is made to the disturbance suddenly appearing off the east Florida coast on the morning of the 18th. The abnormal westerly winds observed in the lower and upper levels at San Juan on the previous day seem to have been intimately connected with the disturbance shown by later surface observations to have been in the vicinity of the Florida coast. The winds at Santo Domingo, Dominican Republic, likewise had a westerly component in the lower levels on the 17th and in the upper levels on the 18th.

The following stations reported pilot-balloon observations showing wind velocities of 30 m. p. s. or higher.

Station.	Septem- ber.	Velocity.	Direction.	Altitude.
		m. p. s.		m.
Ellendale, N. Dak.....	8	33	WSW.....	4,400
Do.....	15	33	WNW.....	7,400
Do.....	26	40	WNW.....	28,200
Lansing, Mich.....	29	30	NNE.....	15,000
Do.....	26	30	N.....	11,200
Lee Hall, Va.....	16	31	W.....	9,780

The observation at Ellendale on the 26th, referred to above, was made with a single theodolite and, as such, must be taken with reservation at such a great altitude.

Easterly movement of the atmosphere above 10,000 meters was observed by means of pilot balloons at the following stations.

Station.	September.	Station.	September.
Aberdeen, Md.....	15	Key West, Fla.....	2, 5, 12
Bolling Field, D. C.....	17, 18	Camp Knox, Ky.....	6
Camp Bragg, N. C.....	22	Lansing, Mich.....	20, 27, 28, 29
Broken Arrow, Okla.....	4, 15, 22	Madison, Wis.....	26, 27, 28
Drexel, Nebr.....	26	Royal Center, Ind.....	21, 22, 26, 29
Ellendale, N. Dak.....	19	San Juan, P. R.....	30
Groesbeck, Tex.....	1	Washington, D. C.....	28
Ithaca, N. Y.....	30		